

IV. REMARKS

1. Claims 20, 22-32, 37, 41, 43 and 44 are amended. Claim 21 is cancelled without prejudice. Claim 47 is new.
2. A new declaration identifying the citizenship of the inventors is being filed herewith.
3. With respect to the Examiner's interpretation of claims 41-46 Claim 41 is amended to recite "a near net shape powder metal workpiece".
4. With respect to the double patenting advisement, claim 21 is cancelled without prejudice.
5. With respect to the rejection under 35 U.S.C 112, first paragraph the specification has been amended to reflect the language from claims 31 and 32.
6. Claims 19-32 are patentable under 35 U.S.C. 103(a) over Amateau et al. (US 5,451,275, hereinafter "Amateau") and Cole (US 5,711,187). Claim 19 calls for rolling the gear teeth surfaces of the powder metal workpiece to a desired outer peripheral profiled shape. This feature is not disclosed or suggested by the combination of Amateau and Cole.

All that is disclosed in Amateau is that each rolling gear die (44, 46) has an outer peripheral profiled surface for rolling the gear teeth surfaces of the workpiece (42) to a desired outer peripheral profiled shape (Col. 12, L. 64 - Col. 13, L. 2). The workpieces in Amateau are wrought steel or forged steel workpieces. Nowhere does Amateau disclose or suggest rolling the gear teeth surfaces of the powder metal workpiece to a desired outer peripheral profiled shape as called for in Applicant's

claim 19. Combining Amateau with Cole fails to remedy this defect.

Cole only discloses densification of the gear teeth by rolling (See e.g. Col. 1, L. 38-39; Col. 2, L. 42-45). There is absolutely no disclosure in Cole of rolling the gear teeth surfaces of the workpiece to a desired outer peripheral profiled shape as recited in Applicant's claims. The densification of Cole is performed before heat treatment and hardening thus, requiring additional finishing steps such a grinding. Thus, claim 19 is patentable over the combination of Amateau and Cole at least for this reason. Claims 20 and 22-32 are patentable at least by reason of their respective dependencies.

Further, claim 28 recites applying densifying pressure to surfaces of at least the gear tooth root and gear tooth flank regions of the pressed and sintered powder metal gear blank to establish densification in the range of 90 to 100 percent of full theoretical density to a depth of about 70 microns and up to about 1300 microns. The Examiner argues that the densification range of Cole renders the range claimed by Applicant obvious. Applicant respectfully disagrees. Cole specifically teaches away from the range claimed by applicant at column 1, lines 46-49 which recites that "[n]ormally the depth of densification is in the range 380 to 500 microns. We have found that little additional benefit is achieved if the depth of densification exceeds 1000 microns." A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. (See, MPEP § 2144.05 (III); *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997); and *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir.

2004)). It would not be obvious to one skilled in the art to modify Cole to achieve what is claimed in Applicant's claim 28 because Cole specifically states that "little additional benefit is achieved if the depth of densification exceed 1000 microns". Thus, claim 28 is patentable over the combination of Amateau and Cole for this additional reason.

Moreover, it is respectfully submitted that there is no legal motivation to combine Amateau with Cole. In order to establish a *prima facie* case of obviousness under 35 U.S.C. 103(a), there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. There must also be a reasonable expectation of success, and the reference(s), when combined, must teach or suggest all of the claim limitations. (See M.P.E.P. § 2142). As noted above, the combination of Amateau and Cole does not disclose or suggest each feature of Applicant's claims. Thus, a *prima facie* case of obviousness cannot be established.

Neither Amateau nor Cole provide any suggestion or motivation to be combined or modified as proposed by the Examiner and the Examiner's proposition that Applicant's invention would be obvious as recited in the claims is not supported by the factual contents of Amateau or Cole.

Amateau is directed to metallurgically treating high performance steel gears by thermomechanical means to produce high strength and accurate contact surfaces using controlled deformation net shape finishing techniques (Col. 1, L. 11-15). There is no disclosure in Amateau of powder metal gears or powder metal gear blanks.

Cole discloses a powder metal gear wheel formed from a pressed and sintered powder metal blank where the surfaces of the gear teeth are hardened by densifying the tooth surface layers (Col. 1, L. 36-44). Cole describes a pre-finishing technique of gear rolling that is performed prior to heat treatment and hardening, and is applicable for sintered low carbon low alloy steel compositions similar to SAE 4100, SAE 4600, and SAE 8600 grades in the soft machinable condition, particularly compositions with carbon contents of 0.2% or less (Col. 2, L. 2-24). The powder metal gears of Cole, either in the as-sintered condition or after surface densification by gear rolling, have to be heat treated by carburizing and hardening operations to achieve the specific surface hardness, hardness gradient and core strength necessary for high load bearing power transmission gearing. Any surface hardening achieved due to work hardening by gear rolling and related surface densification as described in Cole is substantially eliminated during the subsequent heat treatment process. Furthermore, because the sintered and densified powder metal gears produced by the method described in Cole are subjected to heat treatment and hardening, the gears may require subsequent hard finishing by grinding, skiving, burnishing or honing operations to achieve the required level of accuracy, resulting in removal of about 150 microns of the densified surface region of gear teeth. This removal of the portion of the surface region with improved apparent hardness of powder metal densified surface layers lowers the load bearing capacity of the gears. Thus, there is nothing in Cole would motivate one skilled in the art to modify Amateau to arrive at what is claimed by Applicant.

When "the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where

such a teaching or suggestion appears in the reference". In re Rijckaert, 28 USPQ2d 1955, 1057 (Fed. Cir. 1993). The Examiner is requested to provide an indication as to where any such teaching, suggestion or motivation appears in the reference. Absent such a teaching, it is submitted that a *prima facie* case of obviousness over Amateau and Cole under 35 U.S.C. 103(a) is not established.

7. Claims 25 and 26 are patentable under 35 U.S.C. 103(a) at least by reason of their respective dependencies.

8. Claims 35, 37-39 and 41-46 are patentable under 35 U.S.C. 103(a) over Sonti et al. (US 6,779,270, hereinafter "Sonti") and Cole. Claim 35 calls for rolling the gear teeth surfaces of the powder metal workpiece to a desired outer peripheral profiled shape. This feature is not disclosed or suggested by the combination of Sonti and Cole.

Sonti discloses that hobbled gear tooth profiles are produced for subsequent full form finishing (Col. 5, L. 2-4). The workpieces in Sonti are wrought steel or forged steel workpieces. Nowhere does Sonti disclose or suggest rolling the gear teeth surfaces of a powder metal workpiece to a desired outer peripheral profiled shape. Combining Sonti with Cole fails to remedy this defect.

As described above, Cole only discloses densification of the gear teeth by rolling (See e.g. Col. 1, L. 38-39; Col. 2, L. 42-45). There is absolutely no disclosure in Cole of rolling the gear teeth surfaces of the workpiece to a desired outer peripheral profiled shape as recited in Applicant's claims. The densification of Cole is performed before heat treatment and hardening thus, requiring additional finishing steps such a grinding. Thus, claim 35 is patentable over the combination of


Sonti and Cole at least for this reason. Claims 41 and 43 are patentable over the combination of Sonti and Cole for reasons that are substantially similar to those described above with respect to claim 35. Claims 37-39, 42 and 44-46 are patentable at least by reason of their respective dependencies.

It is further submitted that there is no motivation to combine Sonti with Cole for reasons that are substantially similar to those described above with respect to claim 19.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for one additional dependent claim and any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,


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